

Bellwork: 2/21/13

Divide using synthetic division:

$(x^3 + 7x^2 - 38x - 240)$  divided by  $(x + 5)$

$$\begin{array}{r|rrrr} -5 & 1 & 7 & -38 & -240 \\ & +\downarrow & -5 & -10 & 240 \\ \hline & 1 & 2 & -48 & 0 \end{array}$$

$x^2 + 2x - 48$

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### Section 5.4 - Synthetic Division - part 2

Synthetic Division is most useful when trying to find factors of a polynomial.

- 1) Determine whether each binomial is a factor of  $x^3 + x^2 - 16x - 16$

$x + 2 = 0$

a)  $x + 2$

$$\begin{array}{r|rrrr} -2 & 1 & 1 & -16 & -16 \\ & +\downarrow & -2 & 2 & 28 \\ \hline & 1 & -1 & -14 & 12 \end{array}$$

NO,  $x + 2$  is not a factor.

b)  $x - 4$

$$\begin{array}{r|rrrr} 4 & 1 & 1 & -16 & -16 \\ & +\downarrow & 4 & 20 & 16 \\ \hline & 1 & 5 & 4 & 0 \end{array}$$

Yes,  $x - 4$  is a factor.

*no remainder*

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2) Determine whether each binomial is a factor of

$$x^3 + 4x^2 + x - 6$$

a)  $x+3$

$$\begin{array}{r|rrrr} -3 & 1 & 4 & 1 & -6 \\ & & -3 & -3 & 6 \\ \hline & 1 & 1 & -2 & 0 \end{array}$$

Yes it is  
a factor

b)  $x-3$

$$\begin{array}{r|rrrr} 3 & 1 & 4 & 1 & -6 \\ & & 3 & 2 & 6 \\ \hline & 1 & 7 & 2 & 0 \end{array}$$

No!

Use synthetic division and the given factor to completely factor each polynomial function.

3)  $y = x^3 + 7x^2 - 38x - 240$  ;  $(x+5)$

$$\begin{array}{r|rrrr} -5 & 1 & 7 & -38 & -240 \\ & & -5 & -10 & 240 \\ \hline & 1 & 2 & -48 & 0 \end{array}$$

$x^2 + 2x - 48$

Factors:  $(x+8)(x-6)(x+5)$

4)  $y = x^3 + 6x^2 + 11x + 6 ; (x+1)$

$$\begin{array}{r} \underline{-1} \quad | \quad 1 \quad 6 \quad 11 \quad 6 \\ \downarrow \quad -1 \quad -5 \quad -6 \\ \hline 1 \quad 5 \quad 6 \quad | \quad 0 \\ x^2 + 5x + 6 \end{array}$$

Factors:  $(x+1)(x+2)(x+3)$

## Factor Completely

Homework: pg 308 #29-30 and pg 309 #49-56

is it a factor?

